

U.S. Patent Application Serial No. 10/527,699

Amendment filed January 2, 2008

Reply to OA dated August 2, 2007

AMENDMENTS TO THE CLAIMS:

Please cancel claim 8 without prejudice or disclaimer, and amend claims 1, 4, 6, 9-15, 17, 19 and 20, as follows. This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently Amended): A catalyst composition comprising a crosslinked organic polymer compound and a palladium catalyst, wherein said catalyst is physically carried on said crosslinked organic polymer compound, prepared by

homogenizing a straight chain organic polymer compound having a crosslinkable functional group, and the palladium catalyst in a solvent dissolving said straight chain organic polymer compound;

then depositing the composition formed; and

subjecting a crosslinkable functional group in said deposited composition to a crosslinking reaction,

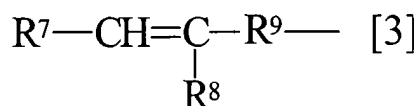
and wherein said straight chain organic polymer compound is obtained by polymerizing

1) the monomer having a crosslinkable functional group and a polymerizable double bond represented by :

(1) a glycidyl compound having an epoxy group as a crosslinkable functional group, selected from the group consisting of a glycidyl ether and a glycidyl ester represented by the following general formulas [1] and [2], respectively,



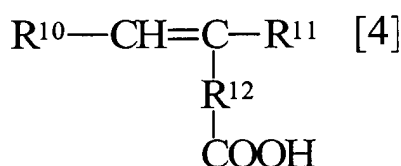
wherein R², R³, R⁵ and R⁶ each independently represents a hydrogen atom or an alkyl group having 1 to 6 carbon atoms; X and Z each independently represents an alkylene group having 1 to 6 carbon atoms; R² may form a ring of 3 to 6 members together with carbon atoms of R³ or X, and R⁵ may form a ring of 3 to 6 members together with carbon atoms of R⁶ or Z; and R¹ and R⁴ each independently is a group represented by the following general formula [3]:



wherein R⁷ and R⁸ each independently represents a hydrogen atom or an alkyl group having 1 to 6 carbon atoms; R⁹ represents a direct-linkage, an alkylene group having 1 to 6 carbon atoms, an arylene group having 6 to 9 carbon atoms, an arylalkylene group having 7 to 12 carbon atoms or an arylenealkylene group having 7 to 15 carbon atoms, wherein the aromatic ring in the arylene or

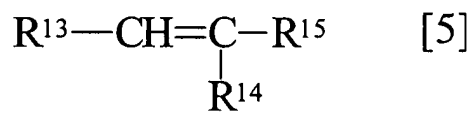
arylenealkylene group may have an alkyl group having 1 to 4 carbon atoms, an alkoxy group having 1 to 4 carbon atoms and/or a halogen atom, as a substituent;

(2) a monomer having a carboxyl group as a crosslinkable functional group, represented by the following general formula [4]:



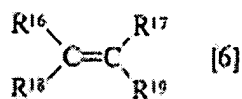
wherein R¹⁰ represents a hydrogen atom or an alkyl group having 1 to 6 carbon atoms; R¹¹ represents a hydrogen atom, an alkyl group having 1 to 6 carbon atoms, an aryl group having 6 to 10 carbon atoms or an aralkyl group having 7 to 12 carbon atoms, wherein the aromatic ring in the aryl group or aralkyl group may have an alkyl group having 1 to 4 carbon atoms, an alkoxy group having 1 to 4 carbon atoms and/or a halogen atom as a substituent; and R¹² represents a direct-linkage, an alkylene group having 1 to 6 carbon atoms, an arylene group having 6 to 9 carbon atoms, an arylalkylene group having 7 to 12 carbon atoms or an arylenealkylene group having 7 to 15 carbon atoms; or

(3) a monomer having a hydroxyl group as a crosslinkable functional group, represented by the following general formula [5]:



wherein R¹³ represents a hydrogen atom or an alkyl group having 1 to 20 carbon atoms; R¹⁴ represents a hydroxyl group that may have a carbonyl group and/or an oxygen atom; R¹⁵ represents a hydrogen atom, an alkyl group having 1 to 6 carbon atoms, an aryl group having 6 to 10 carbon atoms or an aralkyl group having 7 to 12 carbon atoms; and an aromatic ring in the above aryl group or aralkyl group may have an alkyl group having 1 to 4 carbon atoms, an alkoxy group having 1 to 4 carbon atoms and/or a halogen atom, as a substituent, and optionally

2) the monomer having a polymerizable double bond is represented by the general formula
[6]:



wherein R¹⁶ and R¹⁷ each independently represent a hydrogen atom or an alkyl group having 1 to 6 carbon atoms; R¹⁹ represents a hydrogen atom, a halogen atom or an alkyl group having 1 to 6 carbon atoms; R¹⁸ represents a carboxyl group, a hydroxyl group, an acyloxy group having 2 to 6 carbon atoms, an arylacyloxy group having 7 to 15 carbon atoms, an alkoxycarbonyl group having 2 to 6 carbon atoms, an alkyl group having 1 to 6 carbon atoms, an aryl group having 6 to 10 carbon atoms and an aralkyl group having 7 to 12 carbon atoms; an aromatic ring in the above arylacyloxy group, aryl group and aralkyl group, may have further an alkyl group having 1 to 4 carbon atoms, an alkoxy group having 1 to 4 carbon atoms or a halogen atom, as a substituent.

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Claim 2 (Original): The composition according to Claim 1, wherein the palladium catalyst is Pd(0) or a salt of Pd(II).

Claim 3 (Original): The composition according to Claim 2, wherein Pd(0) has no ligand.

Claim 4 (Currently Amended): The composition according to Claim 1, wherein the crosslinked organic polymer compound is:

a crosslinked product of a polymer or a copolymer obtained by polymerizing or copolymerizing 1) at least one monomer ~~having a crosslinkable functional group and a polymerizable double bond~~, selected from (1) said glycidyl compound having an epoxy group, (2) said monomer having a carboxyl group, and (3) said monomer having a hydroxyl group or

a crosslinked product of a copolymer obtained by copolymerizing 1) at least one monomer having a crosslinkable functional group and a polymerizable double bond selected from (1) said glycidyl compound having an epoxy group, (2) said monomer having a carboxyl group, and (3) said monomer having a hydroxyl group, and 2) at least one monomer having a polymerizable double bond which is represented by the general formula [6].

Claim 5 (Previously Presented): The composition according to Claim 4, wherein the crosslinked organic polymer compound is a crosslinked product of a copolymer obtained by copolymerizing :

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- 1) two monomers having a crosslinkable functional group and a polymerizable double bond
and
2) one monomer having a polymerizable double bond.

Claim 6 (Currently Amended): The composition according to Claim 4, wherein the crosslinkable functional group is an epoxy group, a carboxyl group, a hydroxyl group[[,]] or an acyloxyl group,~~an isocyanato group or an amino group.~~

Claim 7 (Previously Presented): The composition according to Claim 4, wherein ratio of a monomer unit derived from a monomer having a crosslinkable functional group and a polymerizable double bond is 0.1 to 100% based on all monomer units in the whole copolymer before crosslinking of the crosslinked organic polymer compound.

Claim 8 (Canceled)

Claim 9 (Currently Amended): The composition according to Claim [[8]] 4, wherein :
one monomer having a crosslinkable functional group and a polymerizable double bond is a glycidyl ether represented by the general formula [1]; and
the other monomer having a crosslinkable functional group is a monomer represented by the general formula [4] containing a carboxyl group, as a crosslinkable functional group, or a monomer

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represented by the general formula [5] containing a hydroxyl group as a crosslinkable functional group.

Claim 10 (Currently Amended): The composition according to Claim [[8]] 4, wherein at least one of the monomers ~~monomer~~ having a crosslinkable functional group and a polymerizable double bond represented by the general formulas [1], [2], [4] and [5], and monomers having a polymerizable double bond represented by the general formula [6], ~~is one having~~ has an aromatic ring.

Claim 11 (Currently Amended): The composition according to Claim [[8]] 4, wherein all of monomers having a crosslinkable functional group and a polymerizable double bond represented by the general formulas [1], [2], [4] and [5], and of monomers having a polymerizable double bond represented by the general formula [6], ~~are those having~~ have an aromatic ring.

Claim 12 (Currently Amended): The composition according to Claim [[8]] 4, wherein in a monomer containing a hydroxyl group as a crosslinkable functional group, represented by the general formula [5], R¹⁴ is a straight chain hydroxyalkyl group having 1 to 50 carbon numbers, which may contain an oxygen atom.

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Claim 13 (Currently Amended): The composition according to Claim 4, wherein in the crosslinked organic polymer compound has a crosslinked portion between an alkylene chain derived from a polymerizable double bond, and another alkylene chain derived from a polymerizable double bond, and

the shortest number of atoms in the shortest chain of said crosslinked portion ~~existing between an alkylene chain derived from a polymerizable double bond and another alkylene chain derived from a polymerizable double bond~~ is 1 to 400.

Claim 14 (Currently Amended): The composition according to Claim 1, wherein the crosslinked organic polymer compound is that obtained by crosslinking a copolymer of:

([[1]]I) a glycidyl compound having an epoxy group and a polymerizable double bond;

([[2]]II) a styrene type monomer; and

([[3]]III) an acrylic acid type monomer or a monomer containing a hydroxyalkyl group having at least one oxygen atom and a polymerizable double bond.

Claim 15 (Currently Amended): The composition according to Claim 14, wherein the monomer of ([[3]]III) in the crosslinked organic polymer compound ~~is a copolymer of a monomer~~ having has a hydroxyalkyl group containing at least one oxygen atom and a polymerizable double bond.

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Claim 16 (Original): The composition according to Claim 14, wherein :

the glycidyl compound having an epoxy group and a polymerizable double bond is vinylbenzyl glycidyl ether or vinyl phenylglycidyl ether;

the styrene type monomer is styrene or methylstyrene;

the acrylic acid type monomer is an acrylic acid or a methacrylic acid; and

the monomer containing a hydroxyalkyl group having at least one oxygen atom and a polymerizable double bond is tetraethylene glycol monomethacryloyl ester or tetraethylene glycol mono-2-phenyl-2-propenyl ether.

Claim 17 (Currently Amended): A method for producing the composition according to Claim 1, ~~characterized in that~~ comprising the steps of:

homogenizing a straight chain organic polymer compound having a crosslinkable functional group, and a palladium catalyst ~~are homogenized~~ in a solvent which dissolves said straight chain organic polymer compound;

~~followed by~~ depositing the composition produced; and

subjecting a crosslinkable functional group in said deposited composition to a crosslinking reaction.

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Claim 18 (Original): The method for production according to Claim 17, wherein the palladium catalyst is a complex with triphenylphosphine, tri-t-butylphosphine, triethylphosphine, or trimethylphosphine.

Claim 19 (Currently Amended): A method for performing a substitution reaction at an allyl position, ~~characterized in that~~ comprising the steps of:

reacting an allyl carbonate ~~[[and]]~~ with a nucleophilic agent ~~are reacted~~ in the presence of the composition according to Claim 1 to form a compound where the carbon nucleophilic agent ~~substitutes~~ is substituted at carboxyl ester position of the allyl carbonate.

Claim 20 (Currently Amended): A method for performing an oxidization reaction of an alcohol, ~~characterized in that~~ comprising the steps of:

reacting the composition according to Claim 1 ~~is reacted~~ with an alcohol to form a ketone compound corresponding to the alcohol.